

## CLAIMS

1. A server system for distributing an electromotive power assisted bicycle that enables via a communication network an on-line shopping or a rental service of an  
5 electromotive power assisted bicycle comprising a primary bicycle unit having a traveling function basically provided by a pedal effort, which is assembled with components of an electromotive power assisting kit, in which  
said electromotive power assisting kit comprises at  
10 least:  
a pedal effort detection means adapted to detect the pedal effort;  
a drive unit adapted to output an electromotive power based on the detected pedal effort in accordance with  
15 a control program;  
a force-combining means for combining the output electromotive power with the pedal effort; and  
a battery for said drive unit, wherein a plurality of options are made available for at least one component of  
20 said electromotive power assisting kit,  
said server system for distributing an electromotive power assisted bicycle characterized in comprising:  
a control means;  
a communication means connectable to a user  
25 terminal via the communication network;  
a first searching means for searching bicycle information defining said primary bicycle unit; and  
a second searching means for searching

electromotive power assisting information defining said electromotive power assisting kit, wherein said control means includes:

a first display function for indicating at least  
5 a part of said bicycle information in said user terminal;

a second display function for indicating at least a part of said electromotive power assisting information in said user terminal under a condition where some components of the electromotive power assisting kit  
10 having a plurality of options that have been made available for a user to choose,; and

a designing function for creating design information so that, when either one of said components of said electromotive power assisting kit having a plurality  
15 of options is selected and determined in said user terminal, said electromotive power assisting kit containing said component of selected aspect can be assembled with said primary bicycle unit.

2. A server system for distributing an electromotive  
20 power assisted bicycle in accordance with claim 1, in which

said primary bicycle unit includes an one-way clutch means for connecting a drive shaft with a sprocket such that a rotating torque of said drive shaft substantially only in one direction is selectively transmitted to said  
25 sprocket, and

said pedal effort detection means detects a physical quantity that varies in response to a deformation of the one-way clutch means caused by the pedal effort.

3. A server system for distributing an electromotive power assisted bicycle in accordance with claim 2, in which said one-way clutch means includes:

two pedal effort transmission parts disposed  
5 adjacently to each other along the axial direction of said drive shaft, which are engagingly locked to each other during a rotation in said only one direction so as to extend a space between said two parts; and

an elastic member disposed so as to resist against the  
10 extension in the space between said two pedal effort transmission parts, wherein

said pedal effort detection means includes a strain sensor for detecting a strain in said elastic means.

4. A server system for distributing an electromotive  
15 power assisted bicycle in accordance with any one of claims 1 through 3, in which

a plurality of types of unit is made available for said primary bicycle unit, wherein

said first display function indicates said bicycle  
20 information in said user terminal under a condition where a plurality of types of primary bicycle unit is made available for a user to choose; and

said designing function, when either one of the types of the primary bicycle unit is selected in said user  
25 terminal, creates design information to allow the components of the electromotive power assisting kit to be assembled with the selected type of primary bicycle unit.

5. A server system for distributing an electromotive

power assisted bicycle in accordance with any one of claims  
1 through 4, further comprising:

a third searching means for searching information  
about suppliers and assemblers concerning said primary  
5 bicycle unit, said electromotive power assisting kit and  
assembling thereof respectively; and

a user information acquisition means for acquiring  
user information from said user terminal, wherein said  
server system

10 issues orders for said primary bicycle unit and said  
electromotive power assisting kit, which have been selected  
by the user, to respective corresponding suppliers via the  
communication network;

sends information about the assembler to the  
15 respective suppliers via the communication network; and

sends said design information and the acquired user  
information to said assembler.

6. A server system for distributing an electromotive  
power assisted bicycle in accordance with any one of claims  
20 1 through 5, in which

said bicycle information includes at least an image  
data on the primary bicycle unit and a data on dimension  
and position of each frame, and said first display function  
indicates said image data or a compressed image of said  
25 primary bicycle unit in said user terminal; and

said electromotive power assisting information  
includes at least an image data on said electromotive power  
assisting kit and a data on geometry and dimension of said

electromotive power assisting kit, and said second display function indicates said image data or a compressed image of said electromotive power assisting kit in said user terminal.

5    7.    A server system for distributing an electromotive power assisted bicycle in accordance with any one of claims 1 through 6, in which a plurality of options prepared for at least one component of said electromotive power assisting kit relate to at least either one of a type and a  
10 position of installation of said component of said electromotive power assisting kit.

8.    A server system for distributing an electromotive power assisted bicycle in accordance with claim 7, in which said second display function provides an image display of  
15 said types of said components of said electromotive power assisting kit.

9.    A server system for distributing an electromotive power assisted bicycle in accordance with claim 8, in which said second display function provides an image of a certain  
20 type of electromotive power assisting kit, which has been selected in said user terminal, superimposed on the image of the primary bicycle unit in a state where said selected kit is virtually assembled with said primary bicycle unit, so as to be displayed on the user terminal.

25    10.   A server system for distributing an electromotive power assisted bicycle in accordance with any one of claims 7 through 9, in which said user terminal is equipped with a mouse, wherein

said second display function makes a position of installation of said component of said electromotive power assisting kit in said image display selectable by moving the specific component selected by a mouse click in accordance with a mouse drag so as to be displayed in a desired position.

11. A server system for distributing an electromotive power assisted bicycle in accordance with any one of claims 1 through 10, in which said designing function issues said design information after a notice that either one of the options of said components of the electromotive power assisting kit having a plurality of options having been determined in said user terminal.

12. A server system for distributing an electromotive power assisted bicycle in accordance with any one of claims 1 through 11, in which said designing function of said control means further comprises:

a determining function for determining whether it is possible for said component of said electromotive power assisting kit selected in said user terminal to be assembled with said primary bicycle unit based on said bicycle information and said electromotive power assisting information; and

a notifying function for notifying the user terminal of a determination that it is impossible for the selected component of the electromotive power assisting kit to be assembled with the primary bicycle unit when said determining function has determined so.

13. A server system for distributing an electromotive power assisted bicycle in accordance with any one of claims 1 through 12, in which said designing function of said control means is adapted such that, if said component of  
5 said electromotive power assisting kit selected in said user terminal needs other components of the electromotive power assisting kit that have not been selected, said designing function creates design information to issue an instruction that those required other components of said  
10 electromotive power assisting kit should be additionally assembled together with said selected component.

14. A server system for distributing an electromotive power assisted bicycle in accordance with any one of claims 1 through 13, in which a plurality of options of the drive  
15 units are prepared, wherein each of the options includes at least a different control program from each other.

15. A server system for distributing an electromotive power assisted bicycle in accordance with claim 14, in which as a set of plural different control programs, at  
20 least either one of the following programs is prepared, including:

a plurality of electromotive power assisting control programs for inducing a variation in an assist ratio relative to a bicycle speed in each different manner;

25 an aerobic exercise control program enabling aerobic exercise;

a muscle exercise control program enabling muscle exercise; and

a control program allowing for traveling exclusively with an electromotive power.

16. A server system for distributing an electromotive power assisted bicycle in accordance with claim 15, in  
5 which said drive unit controlled by said aerobic exercise control program or said muscle exercise control program selects either one of an electromotive power or a loading force based on at least said pedal effort detected by said pedal effort detection means so as to achieve a pedal  
10 effort level enabling aerobic exercise or muscle exercise and allows for said either one of the electromotive power or the loading force to be added to said pedal effort via said force-combining means.

17. A server system for distributing an electromotive  
15 power assisted bicycle in accordance with claim 16, in which said drive unit comprises:

an electric motor; and

an electromagnetic clutch interposed between said electric motor and said force-combining means, wherein  
20 said loading force is applied as a rotational resistance of said electric motor, which is produced by connecting said electric motor with said force-combining means through said electromagnetic clutch under a condition where said electric motor is not energized.

25 18. A server system for distributing an electromotive power assisted bicycle in accordance with claim 17, in which there is a mode made selectable for said battery, where said battery is charged by an electromotive force to



be produced when said electric motor is rotated by a pedal effort against said loading force under a condition where the electric motor is not energized.

19. A server system for distributing an electromotive  
5 power assisted bicycle in accordance with any one of claims 1 through 18, in which as one of the components of said electromotive power assisting kit, a human body parameter measuring means is prepared, wherein

said drive unit sets a pedal effort level based on at  
10 least a human body parameter measured by said human body parameter measuring means and executes a control such that the detected pedal effort represents said pedal effort level.

20. A server system for distributing an electromotive  
15 power assisted bicycle in accordance with claim 19, in which a set of plural types of parameters is prepared as said human body parameter, wherein

said second display function of said control means  
indicates one or more of said plural types of human  
20 parameters to be selectable in said user terminal; and

said designing function creates design information for  
assembling at least a human body parameter measuring means  
for measuring said selected human body parameter and a  
drive unit capable of executing a control based on the  
25 selected human body parameter with said primary bicycle unit.

21. A server system for distributing an electromotive  
power assisted bicycle in accordance with claim 19 or 20,

in which said human body parameter includes at least either one of a heart rate and a blood pressure.

22. A server system for distributing an electromotive power assisted bicycle in accordance with any one of claims  
5 1 through 21, further comprising:

a physical strength/health information acquisition means for acquiring physical strength/health information of a user via the communication network;

a program selecting means for selecting a control  
10 program or a parameter for said control program, which is most suitable for said user, based on the acquired physical strength/health information; and

a program transmission means for transmitting said control program or said parameter for said control program,  
15 which has been selected by said program selecting means, to a user terminal via the communication network.

23. A server system for distributing an electromotive power assisted bicycle in accordance with claim 22, in which said user terminal is prepared as a component of said  
20 electromotive power assisting kit, wherein said control program or said parameter for said control program that has been received can be downloaded to said drive unit of said electromotive power assisted bicycle of said user.

24. A server system for distributing an electromotive  
25 power assisted bicycle in accordance with claim 23, in which said user terminal and said human body parameter measuring means are prepared as components of said electromotive power assisting kit, wherein

said user terminal acquires said human body parameter measured by said human body parameter measuring means as said physical strength/health information of said user.

25. A server system for distributing an electromotive  
5 power assisted bicycle in accordance with any one of claims 1 through 24, further comprising:

a physical strength/health information acquisition means for acquiring physical strength/health information of a user via the communication network; and

10 a program selecting means for selecting a control program or a parameter of said control program, which is most suitable for said user, based on the acquired physical strength/health information, wherein

said designing function of said control means creates  
15 a command to download said selected control program or said parameter of said control program to said drive unit.

26. A server system for distributing an electromotive power assisted bicycle in accordance with any one of claims 1 through 25, in which said control means further comprises  
20 such an ID entry function that, if any components of said electromotive power assisting kit that require authorization are selected in the user terminal, displays an entry screen for prompting the user to enter information representing an ID for the authorization in said user  
25 terminal, wherein said designing information is issued only when the entered ID is verified.

27. A server system for distributing an electromotive power assisted bicycle in accordance with any one of claim

1 through 26, in which said drive unit is mounted to said primary bicycle unit via a unit mounting bracket.

28. A server system for distributing an electromotive power assisted bicycle in accordance with claim 27, in  
5 which said primary bicycle unit includes a drive shaft that is rotated by a pedal effort and a support section for supporting said drive shaft with a bearing; and

said unit mounting bracket has a pair of side plates and a bottom plate connecting to said pair of side plates,  
10 wherein

said unit mounting bracket is secured to said support section with said drive shaft passing through said pair of side plate and with said supporting section clamped between said pair of side plates, and said drive unit is mounted on  
15 said bottom plate and thereby said drive unit is securely mounted to a bicycle body.

29. A server system for distributing an electromotive power assisted bicycle in accordance with claim 28, in which said designing function of said control means creates  
20 the design information for instructing a mounting aspect and a position of said unit mounting bracket based on the selected options of said drive unit and said primary bicycle unit.

30. A server system for distributing an electromotive  
25 power assisted bicycle in accordance with any one of claims 1 through 26, in which said primary bicycle unit has a primary sprocket that is rotatable for transmitting a pedal effort to a driving wheel, and

said force-combining means includes:

a secondary sprocket that is rotatable coaxially  
with said primary sprocket;

a power sprocket to be rotated by said drive unit;

5 and

an auxiliary chain stretched across between said  
secondary sprocket and said power sprocket.

31. A server system for distributing an electromotive  
power assisted bicycle in accordance with claim 30, in

10 which

said second display function provides an indication in  
which said auxiliary chain are stretched over the power  
sprocket of said drive unit located in the position defined  
by the installation condition of said drive unit.

15 32. A server system for distributing an electromotive  
power assisted bicycle in accordance with claim 30 or 31,  
in which said designing function of said control means  
determines a length of said auxiliary chain based on the  
selected options of said drive unit and said primary  
20 bicycle unit and creates the designing information to be  
issued.

33. A server system for distributing an electromotive  
power assisted bicycle in accordance with any one of claims  
1 through 32, in which said battery is mounted to a frame  
25 of said primary bicycle unit via a battery bracket, said  
battery bracket comprising:

a bracket member capable of detachably accommodating  
the battery and engagingly locking the accommodated battery

by a key; and

a bracket retainer to be coupled with said bracket member so as to clamp the body frame.

34. A server system for distributing an electromotive  
5 power assisted bicycle in accordance with any one of claims  
1 through 33, in which

when said position of said battery is selected in said  
user terminal, said designing function of said control  
means creates design information for giving an instruction  
10 on the frame and the position in the frame for said battery  
bracket to be installed.

35. A server system for distributing an electromotive  
power assisted bicycle in accordance with any one of claims  
1 through 34, in which

15 a bicycle speed sensor for detecting a bicycle speed  
is further prepared as a component of said electromotive  
power assisting kit, said sensor comprising:

a ring magnet having a generally flat surface on  
which a plurality of magnet segments are formed so as to  
20 induce a magnetic field that varies spatially at a constant  
angular interval along a circumferential direction over  
said surface, said ring magnet capable of being installed  
so as to rotate coaxially with said section subject to be  
detected;

25 a magnetic field detection means for detecting a  
magnetic field in a fixed location adjacent to a surface of  
said ring magnet; and

a signal processing means for detecting a

rotational speed of said section subject to the detection or a physical quantity relating thereto based on a magnetic field signal detected by said magnetic field detection means.

5 36. A server system for distributing an electromotive power assisted bicycle in accordance with claim 35, in which said section subject to the detection represents a rotational part within said drive unit.

37. A server system for distributing an electromotive  
10 power assisted bicycle in accordance with any one of claims 1 through 36, in which a control switch for operationally providing an ON-OFF command on an operation of said drive unit is further prepared as a component of said electromotive power assisting kit, wherein

15 said control switch is initially in a neutral mode, defining neither of an ON-mode nor an OFF-mode, and adapted to return to the neutral mode position after the shifting operation either to the ON-mode position or to the OFF-mode position.

20 38. A server system for distributing an electromotive power assisted bicycle in accordance with any one of claims 1 through 37, in which a cover housing for covering an area defined by components of said frame of said primary bicycle unit is further prepared as a component of said  
25 electromotive power assisting kit, wherein

said second display function further provides an indication in which the area to be covered by said cover housing can be designated in the user terminal, and

said designing function further creates design information for assembling the cover housing suitable for covering said area designated in said user terminal with said primary bicycle unit.

- 5 39. A server system for distributing an electromotive power assisted bicycle in accordance with claim 38, in which said designing function designs a geometry and dimension of said cover housing suitable for covering the enclosed area designated in said user terminal based on at  
10 least said frame of said primary bicycle unit and a physical relationship relative to other components of said electromotive power assisting kit.
40. A server system for distributing an electromotive power assisted bicycle in accordance with claim 38 or 39,  
15 in which said second display function of said control means provides an indication in which at least one of a color, a transparency and a type of decoration of said cover housing can be selected by a user.
41. A server system for distributing an electromotive  
20 power assisted bicycle in accordance with any one of claims 1 through 40, in which said communication network represents any one of the Internet, an intranet or a local area network.
42. A server system for distributing an electromotive  
25 power assisted bicycle in accordance with any one of claims 1 through 41, in which said user terminal represents any one of a personal computer, a cellular phone or a PHS.
43. A server system for distributing an electromotive



power assisted bicycle that enables via a communication network an on-line shopping or a rental service of an electromotive power assisted bicycle comprising a primary bicycle unit having a traveling function basically provided  
5 by a pedal effort, which is assembled with components of an electromotive power assisting kit, in which

a plurality of types of said primary bicycle unit is prepared, and

said electromotive power assisting kit comprises at  
10 least:

a pedal effort detection means adapted to detect the pedal effort;

a drive unit adapted to output an electromotive power based on the detected pedal effort in accordance with  
15 a control program;

a force-combining means for combining the output electromotive power with the pedal effort; and

a battery for said drive unit,

said server system for distributing an electromotive  
20 power assisted bicycle characterized in comprising:

a control means;

a communication means connectable to a user terminal via the communication network;

a first searching means for searching bicycle  
25 information defining said primary bicycle unit; and

a second searching means for searching electromotive power assisting information defining said electromotive power assisting kit, wherein said control

means includes:

a first display function for indicating at least  
a part of said bicycle information in said user terminal  
under a condition where a plural types of primary bicycle  
5 unit have been made available for a user to choose;

a second display function for indicating at  
least a part of said electromotive power assisting  
information in said user terminal; and

a designing function for creating design  
10 information such that, when either one of said plural types  
of primary bicycle unit is selected in said user terminal,  
respective components of said electromotive power assisting  
kit can be assembled with said selected type of said  
primary bicycle unit.